1. Observations on the Characters of the Echinoidea.—IV. The *Echinometridæ*; their Affinities and Systematic Position.

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[Received February 24, 1881.]

In continuation of the observations which I have already had the honour of bringing before the Society, I enter on this occasion into an account of some of the characteristics of what is, perhaps, the most difficult group of all the Echinoidea. The remarkable, though only apparent, asymmetry of the test of some of the Echinometridæ can only receive its rational explanation from the results of developmental studies; it is not, however, idle to prepare for these by giving some definite information as to the parts and proportions of the constituent tests.

The genus *Echinometra*, with the asymmetrical forms allied thereto, *Heterocentrotus* and *Colobocentrotus*, have, by the almost universal consent of naturalists, been closely associated one with another; and there is as yet no evidence which would justify us in offering any real opposition to these views. On the other hand, when we come to investigate the kind, and to weigh the amount and value, of the characters which have led to the union just mentioned, we find them to be slighter than this universal consent would have inclined us to imagine.

It is not necessary to recapitulate the history of the group; the publication of a Revision should save us from that, where we feel enabled to follow it; and I purpose, therefore, to begin with what students of the Echinoidea look upon as the starting-point of their future labours.

In the latest 'Revision of the Echini,' the family "Echinometradæ"[1] is accepted with very much the same kind of limitations as were suggested in 1855 by Dr. Gray[2], who grouped his sixth family thus:—

Fam. 6. Echinometradæ.

Ambulacral area only half as wide as the interambulacral area; ambulacral pores in groups of four or more, forming an arched series round the ambulacral tubercles.

A. Body circular.

1. *Strongylocentrotus.*

B. Body oblong.

2. *Echinometra.*
3. *Holo*[i. e. *Hetero*]*centrotus.*
4. *Colobocentrotus.*

[1] Where Gray or Agassiz are quoted the term *Echinometridæ* is spelt as they spelt it; in other places a spelling which, as I humbly imagine, is more correct, is followed.

[2] P. Z. S. 1855, p. 37.

As subgenera of *Strongylocentrotus*, Prof. Alex. Agassiz includes *Sphærechinus* and *Pseudoboletia*, the former of which Dr. Gray would appear to have included with *Echinus* in his fifth family, while the latter is a genus of which no species was then known. *Echinostrephus* had not, in 1855, been distinguished from *Echinus* or *Psammechinus*; while *Stomopneustes*, under the title of *Heliocidaris*, was also regarded by Gray as closely allied to *Echinus*. Of the nine genera, or subgenera, found in the family of the Echinometradæ of Agassiz, viz. (1) *Colobocentrotus*, (2) *Heterocentrotus*, (3) *Echinometra*, (4) *Parasalenia*, (5) *Stomopneustes*, (6) *Strongylocentrotus*, (7) *Sphærechinus*, (8) *Pseudoboletia*, (9) *Echinostrephus*, the first three and the sixth alone fall into Gray's family, the fourth and the eighth were unknown to science, while a different view was taken as to the affinities of *Stomopneustes*, *Sphærechinus*, and *Echinostrephus*. They were regarded, in fine, as being more closely allied to *Echinus*, because they have the "ambulacral area half as wide as the interambulacral area, with two (or three) close series of double pores, placed in threes; buccal membrane naked; body circular."

We may dismiss the first character, without even examination; for, while it is obviously artificial, it is the same for Gray's two groups of Echinidæ and Echinometradæ. As to the second difference, the arrangement of the pores, there can be little doubt that, judging by it only, *Stomopneustes* has a much closer affinity to the Echinometridæ than to the Echinidæ. And we now come to what is really the kernel of the whole matter. How far is Desor's division into *Oligopori* and *Polypori* natural? and how far is it artificial?

If we examine one of the least modified of the Echinidæ, *e. g. Cidaris tribuloides*, we find that the pores of the ambulacral zones are arranged regularly and equally in pairs, are, in effect, set one behind another in a straight line, and belong each to a single simple plate. If we take a more modified form, such as a species of the restricted genus *Echinus*, we find the pairs of pores have, for the greater part of the test, come to be set in arcs of three; and on close examination it is seen that the plates connected with these pairs of pores are not all of the same size, and that the primary plates fuse to form a secondary plate[1].

This is the typical arrangement among the *Oligopori*; but it by no means holds for all the plates; those nearest the apical area have, more or fewer, the pairs of pores in just as straight lines as *Cidaris tribuloides*.

Taking, as an example of the *Polypori*, *Echinometra subangularis*, we have some six pairs of pores arranged in a much more elaborate arc, and the changes that come to be effected are so great that what form really the distal pair of pores of one arc seem to be the proximal pair of the succeeding arc.

[1] It seems to me that all the advantage lies in continuing to use the nomenclature of Johannes Müller, and to speak of the first or simple plates as *primary*, and the fused plates as secondary; for reasons which, no doubt, are excellent, Prof. Alex. Agassiz has (*op. cit.* pp. 642, 643) elected to reverse this nomenclature, and to speak of the compound plate as the primary one.

Turning now to the mode by which these pores come to be so arranged in the adult, it will be well to recapitulate shortly the present state of our knowledge concerning it. This knowledge has, within the last decade, been very considerably advanced by the elaborate and beautiful researches of Prof. Lovén[1]. I shall depart from a strict following of his account only in using the term "secondary plate" as a translation of his "plaque composée." As has been already pointed out, these secondary plates, when developed, are made up of three or more primary plates. Now, "the primary ambulacral plates of the Echinidæ are either entire (that is to say, they occupy the whole of the distance between the interradial area and the median suture of the ambulacrum[2], or, in other words, extend from the interradial area as far as the middle of the entire plates), or they end by a more or less sharp point. The major primary plates of the peristome forming the series I*a* . . . V*b*, most often consist, in very young individuals, of a first entire primary, of a median primary half plate, and of a third entire primary plate." In an appended table the learned author shows the arrangement of the entire and half plates in the several secondary plates of the corona of a small specimen of *Toxopneustes* (*Strongylocentrotus*) *drobachiensis*. The fourth or fifth of these has two complete and three half primaries, as is shown by the formula—1, (2, 3, 4), 5.

Next we come to the mode of growth of these different primary plates. "Near the aboral edge of a complete composite plate there is deposited the first primary plate of the new plate, then the second, and soon. All the primary plates, and even the half-plates, are primitively entire plates; *that is to say, they extend from the interradial area as far as the median suture of the ambulacrum*[3]. Later on, and during the period in which the entire collection of primary plates constituting the composite plate goes on enlarging, and even before it is completed by the last primary plate, the intermediate plates cease to grow; and while retaining their position on the edge of the ambulacrum, beside the interradial area, they shrink at their extremities, which become separated from the median suture. They consequently become cuneiform. Of these intermediate plates the smallest is always that which is formed first; those which are formed later are always successively larger, whence it follows that the whole group of intermediate primary plates takes the form of a triangle, the apex of which, in the middle of the composite plate, only consists of the projecting extremity of the latest of them. It clearly results from all this, that these intermediate plates are in no way of a more recent origin than the others, that they are neither secondary nor intercalated, but that they are successively formed, after the first entire plate, and before the last;" and Johannes Müller taught just the same.

The formation of the secondary arcs is no less clearly explained, and is shown to be primarily due to the compression from above

[1] 'Études sur les Echinoïdées,' especially pp. 21 *et seq.*
[2] As in *Cidaris*.
[3] The italics are mine.

downwards to which the test is subjected, and to the widening-out of the composite plates during the process of growth.

I have dwelt at this length on the results of Prof. Lovén's labours, not merely for the purpose of directing again attention to them[1], but with the more especial aim of showing that it is only on a misconception of the history that one can speak of secondary plates as different from those first formed, or of such being added on to the sides of a primary plate. But the origin of such a misconception is not far to seek; it must surely be due to a study of the arrangement of the pores of the adult, and be comparable to the formulas of Milne-Edwards and Haime as applied to the structure of the coral-septa; while M. Lovén's work will stand no less on an equality with the elegant and instructive researches of Lacaze-Duthiers[2].

Armed with this knowledge we come now to a consideration of the value of the characters of the arcs of pores. It has been proposed to distinguish the family of the Echinometridæ from the Echinidæ proper on the ground that the former have always more than three pairs of pores to each arc, "while in the Echinidæ the arcs are always composed only of three pairs." "This division, although it appears a numerical one, is yet one of great physiological importance, as the mode of growth of the poriferous zone in these two families is totally unlike"[3].

I am inclined to think that the accomplished author is here using the term *physiological* in some other sense than that to which its etymology and the current usage of qualified persons justly entitles it; he is too experienced a zoologist to attempt to make the functions of organs do the work of morphological and embryological data. However, the mode of growth of the pores is as much matter for morphologists as for physiologists; and the only question which really arises here is, as to the real character of this total unlikeness. If such exists, it may or may not be of value. But, first of all, does it exist?

Prof. Lovén says[4]:—"Les chiffres par lesquels la disposition des pores est désignée chez cette espèce, les 2, 3, 3, 4, etc. de la série I *a* . . V *b*, et les 2, 2, 3, 4, etc. de la série I *b* . . V *a*, se retrouvent non seulement dans les espèces voisines, le *Toxopneustes brevispinosus* (Risso) et le *T. lividus* (Lamk.), mais encore dans le *Loxechinus albus* (Mol.), l'*Echinus esculentus*, L., le *Lytechinus variegatus* (Lamk.), le *Tripneustes ventricosus* (Lamk.), la *Boletia heteropora*, Desor, l'*Amblypneustes ovum* (Lamk.), le *Temnopleurus toreumaticus* (Leske), l'*Echinothrix turcarum*, Peters, l'*Echinocidaris punctulata* (Lamk.), en un mot chez tous les Echinides. Les *Echinometra* n'y font pas exception."

So far, then, as the formation of the two separate families Echinometridæ and Echinidæ is based on the difference in the mode of

[1] A short account is to be found in Prof. Huxley's 'Anatomy of Invertebrated Animals' (1877), p. 568.

[2] Archiv de Zool. Exp. vol. i.

[3] Rev. of the Echini, p. 423.

[4] *T. c.* p. 26.

growth of the pore-plates, the distinction between them altogether breaks down; whether that distinction be physiological or morphological is, then, an unnecessary question.

Coming next to the absolute distinctness of the groups as indicated by the number of the pairs of pores, we are met, first of all, by the considerations which surround the vexed question of the value of any delimitation by the absolute use of definite numbers. On the one hand, it is quite certain that a classification of the Asteroidea which depends on the number of the rays would exhibit a very incomplete account of the systematic relations of the members of the class; but, on the other hand, it is just as true that no better name was ever applied to the winged Insecta than that of Hexapoda, or to the higher Vertebrata than that of pentadactyle; and it is just as clear that the division of modern Ungulates into two groups, one perissodactyle and the other artiodactyle, could only have been suggested by a naturalist capable of seeing a great general truth through a not always constant similarity in detail.

We now have to weigh these two opposing arguments in applying to the Echinidæ (of earlier writers and of Lovén) the mode of classification suggested and worked out by Desor[1], by which we get the two groups of the Oligopori and Polypori. The test to be applied shall be twofold. First, let us see how it works in the hands of so skilful a naturalist as Prof. Alex. Agassiz. His division of the Echinometradæ is defined (as we already know) as, *inter alia*, always having more than three pairs of pores to each arc. But, as a matter of fact, he includes under the Echinometradæ the two genera *Parasalenia* and *Echinostrephus*. Of the former he says "this genus seems to be an Oligopore among the Echinometradæ, having but three pairs of pores in each arc." In speaking of *Echinostrephus* the generic definition includes no reference to the number of pairs of pores in an arc; but in speaking of *E. molare*, the only species of the genus, he says "there are from three to four pairs of pores in each arc, the majority having but three pairs."

The other consideration arises from a study of the facts as exhibited in the tests of various species. If in any of these some of the arcs can be shown to possess only three pairs of pores, it seems to me that such a fact alone would disqualify numerical relations from forming the criteria of generic, or even higher, delimitations.

Turning again to the guide we have already followed, we find this sentence:—"Le quatrième arc, ici muni de quatre pores, n'en a que trois chez quelques individus du *Toxopneustes drobachiensis*, c'est-à-dire que la plaque composée 3 ne possède qu'une seule plaque primaire médiane. Il y a donc quelque variabilité."[2]

So, again, Dr. Lütken finds in the rare *Echinometra oblonga* that, towards either pole of the corona, there are but two or three pairs of pores in each arc[3].

[1] Synopsis des Ech. fossiles. [2] *T. c.* p. 25.

[3] *Cf.* fig. 10 of the first plate in his 'Bidrag til Kundskab om Echinoderme,' 1864.

And, dealing with the restricted genus *Echinometra*, I have myself been able to make somewhat similar observations in the case of *E. oblonga*, *E. subangularis*, and *E. lucunter*.

If we put into a tabular form the numbers of pairs of pores in an arc, we find the average adult arrangement to present very considerable variation, thus :—

Echinometra lucunter	has	5 or 4	pairs of pores.
E. oblonga	,,	5	,, ,,
E. viridis	,,	5	,, ,,
E. subangularis	,,	6 or 5	,, ,,
E. macrostoma	,,	8, 7, or even 3	pairs of pores.
E. vanbrunti	,,	9, 8, or 7	pairs of pores.

Having already insisted on the fact that only three pairs of pores are to be detected in the youngest plates, or some of the plates, on the test of certain so-called polyporous species, we will insist as much as possible on the "polypority" of these forms by detailing the arrangements which are found in the best-developed part of the adult test[1].

(1) *Parasalenia gratiosa*	3	pairs of pores.	
(2) *Echinostrephus molare* ..	3 (or 4)	,,	,,
(3) *Echinometra lucunter*	4 or 5	,,	,,
(4) *E. oblonga*	4 or 5	,,	,,
(5) *E. subangularis*	5 or 6	,,	,,
(6) *Sphærechinus granularis* ..	4, 5, or 6	,,	,,
(7) *E. macrostoma*	7 or 8	,,	,,
(8) *E. vanbrunti*	7, 8, or 9	,,	,,
(9) *Strongylocentrotus bullatus*	7 or 8	,,	,,
(10) *S. franciscanus*	9	,,	,,
(11) *S. albus*	10	,,	,,
(12) *Colobocentrotus atratus* ..	12 (ca.)	,,	,,
(13) *Heterocentrotus trigonarius*	15 (ca.)	,,	,,

We come, then, to the following results :—

(1) There is a series of forms which exhibits a gradual increase in the number of primary plates which go to form a secondary plate ; but

(2) This series always retains indications of secondary plates in which only one primary plate has ceased to grow with the rest.

When we come to take a general survey of the characters exhibited by the pore-plates, we find the primitive arrangement of the *Cidaris* passing gradually into the complex secondary plates of *Heterocentrotus* and *Colobocentrotus*, which would appear to be the most highly differentiated of the Desmosticha.

[1] Bearing in mind the words of Prof. Gegenbaur (Unters. zur vergl. Anat. d. Wirbelthiere (1864), i. p. 116), "So wichtig es ist für die Aufstellung von Unterschieden der einzelnen Lebensformen und ihrer Einrichtung, die ausgebildeten fertigen Zustände der Organisation zu Unterscheidungsobjecten zu nehmen ;" and Flower, Introductory Lecture (1870), p. 37.

It may, at the present juncture, be convenient to recapitulate and extend the results of recent investigations into the characters of the regular Echinoidea.

A classification of the regular Echinoidea is not, as it seems to me, quite so impossible a matter now as it was a few years ago; the discovery, by Mr. Charles Stewart[1], of the internal gills of *Cidaris*, and the extension and independent confirmation of that result by Dr. Hubert Ludwig[2], justifies us in accepting the division into *Branchiata* and *Abranchiata*, proposed by the latter naturalist[3]. Although Johannes Müller had distinctly denied the presence of external gills in *Cidaris*[4], Prof. Alex. Agassiz discovered gill-cuts in the figures of that illustrious anatomist, but only, I fear, by reflecting on the character of the artist, who represents five slits in the median line of the interradial areas; to this, however, Dr. Ludwig has already directed attention.

Readers of the just-mentioned naturalist's essay will remember that he proposes to separate the Echinothuridæ from the rest of the branchiate regular Echinoidea on the ground of the difference in the characters of the buccal plates.

Unfortunately the British-Museum collection contains no specimen of *Asthenosoma*, although an American collection is in possession of a specimen "which the Museum owes to the kindness of Prof. Thomson, collected by the Porcupine Expedition;" and I am therefore unable to give any independent judgment as to the point at issue between Sir W. Thomson and the writer of the just-quoted sentence on the one hand, and Dr. Ludwig on the other. To say nothing of the fact that the Porcupine Expedition was fitted out at the national expense, the present state of the question affords ample evidence of the advantage of rare and typical specimens being deposited in a central and national institution.

Conflicting as the statements are, those of Dr. Ludwig are so explicit, and are made with so distinct a knowledge of the opinions of his predecessors[5], that I think it is, for the present at any rate, the view to which one ought to incline. The Echinothuridæ, then, though *Branchiata*, are distinguished from the rest by having more than one pair of each series of ambulacral plates carried on to the buccal membrane; they may consequently be distinguished as a *polylepid* as compared with a *decalepid* series.

This *decalepid* series includes the Diadematidæ, the Arbaciadæ, the Echinidæ, and the Echinometridæ, together with the Salenidæ. These last are at once to be separated off from the rest by the characters of their apical area; they are *palæoproctous* forms, as

[1] Trans. Linn. Soc. (2), i. p. 569.

[2] Zeitschrift für wiss. Zool. xxxiv. pp. 70–87.

[3] Prof. Alex. Agassiz gives no information, in his preliminary diagnosis, as to the gills of *Aspidodiadema*.

[4] Abh. Berl. Akad. 1853, p. 146.

[5] He speaks of "ein ganz fundamentaler und bis jetzt nicht beachteter Gegensatz zu den Cidariden." The possession of buccal plates being a characteristic of the Desmosticha, the differences which obtain with regard to them are to be insisted on in the arrangement of the constituent families.

distinguished from the *neoproctous*; and they completely retain the primitive disposition of the primary pore-plates.

In the neoproctous group some of the primary plates always lose their primitive relations; but in the Arbaciadæ and the Diadematidæ this does not always affect the plates above the ambitus, and the poriferous zones are in both almost straight; they are *palæosticha*, as compared with the Echinidæ and Echinometridæ, which are *neosticha*; and while the Arbaciadæ present a Cidarid character in the want of connexion between the auricles, the Diadematidæ (as represented by *Diadema*) present a curious ancestral character in the possession of rudimentary internal gills (Ludwig).

Coming now to the Echinometridæ and the Echinidæ, we are at once struck by the fact that it is impossible to find any points of difference between them which are nearly so great, or of such clear systematic value as (1) the presence or absence of external gills, (2) the connexion of the auricles, (3) the presence of a subanal plate, or (4) the number of the perforated buccal plates. Both families are, in other words, branchiate, decalepid, neoproctous, neostichous.

These relations are exhibited in the following Table:—

Table of the Groups of the Echinoidea regularia (*seu* Desmosticha).

No external gills. Auricular arch not complete and not radial. Ambulacral and interambulacral plates continued on to buccal membrane; pores in straight rows, all the pore-plates primary and subequal. ENTOBRANCHIATA[1]. Fam. 1. *Cidaridæ*.

External gills, auricles radial; interambulacral plates not continued on to the buccal membrane. ECTOBRANCHIATA.

Series α (Palæoproctous).

Large suranal plate persistent in apical area. Fam. 2. *Salenidæ*.

Series β (Neoproctous).

Anal plates all secondary.

Subseries i. (polylepid).

More than one pair of ambulacral plates carried on to the buccal membrane from each area. Fam. 3. *Echinothuridæ*.

Subseries ii. (decalepid).

Only five pairs of ambulacral plates on the buccal membrane.

A. Auricular arch not complete. Fam. 4. *Arbaciadæ*.

B. Auricular arch complete; rudimentary internal gill still retained (*Diadema*). Fam. 5. *Diadematidæ*.

C. Auricular arch complete; no rudimentary gill. Fam. 6. *Echinidæ*.

[1] The term Entobranchiata appears to me to be preferable to Abranchiata; and I consequently use Ectobranchiata in place of Branchiata (Ludwig).

Turning our attention now to the Echinidæ, we may define them as Regular Echinoidea, with external gills and five pairs of ambulacral plates on the buccal membrane, in which some sets of primary plates always fuse to form a secondary ambulacral plate, in which the auricular arch is complete, and the rudimentary internal gill entirely lost.

If the above be, then, a good and fair definition of the Echinidæ, we come to a consideration of the points by which its constituent genera may become grouped into distinct subfamilies.

The tables already given show that it is hopeless to expect to be able to find any ground of distinction on the absolute number of pairs of pores in an arc; we cannot say that, at any one point, forms with three pairs of pores end and those with four begin. The character, not being a constant or absolute one, is unfitted for use as a *family*-character; nor are there any points which we can propose as affording so wide a distinction between *Echinometra* and *Echinus*. Personal observation can only confirm the general tendency of the researches of Perrier, Stewart, and Mackintosh on the histological characters of the group in question, and lead to acquiescence in the conclusion of M. Perrier:—"On le voit, les modifications qui caractérisent les Echinométriens sont parfaitement nettes, mais ce ne sont que des modifications dans le type des Echiniens. Le type ne change pas comme lorsqu'on passe du *Cidaris* aux Diadèmes, et de ceux-ci aux *Echinocidaris* ou aux Oursins proprement dits."

These considerations appear to me to be sufficient to justify us in retaining *Echinometra*, *Strongylocentrotus*, *Echinus*, and *Toxopneustes* in one family, and to refuse to follow Dr. Gray or Prof. Agassiz in forming a family Echinometradæ as distinguished from the Echinidæ.

If we look yet a little further we shall find that the elaborateness of the ambulacral plates, the strength of the spines, the size of the buccal apparatus, appear to have culminated in *Heterocentrotus* and *Colobocentrotus* rather than in *Tripneustes* and *Toxopneustes*, which in the latest Revision are, in the systematic list, placed furthest from the Cidaridæ.

Whatever be the significance of the obliquity of the morphological axis, there can be but little doubt that it is of very great importance; and a return to the definition of "body circular," and to the recognition of the differences insisted on by Johannes Müller, seems to be better than a vague union of forms, elevated into a family for no better reason than one that has already (p. 413) been quoted and discussed.

A scheme, therefore, of the following character will probably throw into prominence the points of likeness and unlikeness in the constituent members of the family Echinidæ.

Group I. Body circular.....	ECHININÆ.
(α) Secondary plates formed of three primary plates	e. g. *Echinus*.
(β) Secondary plate formed in adult	

of three or more than three primary plates	e. g. *Strongylocentrotus.*
Group II. Morphological axis set obliquely to long axis of the test	Echinometrinæ.
Group III. Morphological axis set at right angles to long axis of the test [1]	Heterocentrinæ.

On the present occasion the observations now to be recorded are based on the classification of the 'Revision;' the further details of altered classification now proposed can only be worked out when sufficient details as to the Triplechinidæ have been presented to the Society; the Temnopleuridæ have already [2] been touched: but even then *Temnechinus* and *Trigonocidaris* must have a place found for them; perhaps that will, after all, turn out to be not among the Echinidæ at all.

I now proceed to the details of some of the genera of the so-called family "Echinometradæ."

Heterocentrotus.

If the student lets this paper follow in succession the third part of these "Observations," he will, on examining the subjoined percentage values, be struck by the fact that there is not by any means that marked diminution in the proportional values of the actinal and abactinal systems to which attention could scarcely fail to have been drawn in the study of the Temnopleuridæ. The character of these latter, though perhaps hardly so well marked, will be seen when the species of the genus *Echinometra* come under inspection.

I have not been able to detect any very striking differences in the characters of the buccal apparatus of *H. mammillatus* and *H. trigonarius*. The most important is, probably, their difference in size; for while a test of *H. mammillatus*, with a height of 26 millim., gave as a measurement from the tip of the tooth to the top of the epiphysis the almost paradoxical amount of 29 millim., two tests of *H. trigonarius*, 21 and 25 millim. high respectively, gave for the same distance 21 and 23 millim. in the two cases.

In both cases there are ascending and descending processes, which are perhaps a little better developed in *H. mammillatus*, as is also the hammer-headed widening of the free end of the radius, and its division by a median notch.

[1] It is not yet time to forget the words of J. Müller:—"Der Körper nur bei querer Lage symmetrisch, welcher von der erstgenannten Gattung (*Echinometra*) bereits von Brandt erkannt, und durch *Corpus transversum* ausgedruckt, von Agassiz aber nicht bemerkt worden, der diese Formen mit *Echinometra* für schief angesehen hat" (Abh. Berl. Akad. Wiss. 1853, p. 128).

[2] P. Z. S. 1880.

HETEROCENTROTUS MAMMILLATUS.

Greatest diam., in millim.	Morphol. axis, in millim.	Percentage value[1] of				
		Height.	Actinostome.		Abactinal area.	Anal area.
			Long axis.	Morph. axis.		
44	37	56·7	56·7	55·4	24·3	10·8
45	36	55·5	63·8	61·1	27·7	11·1
59	53	58·4	50	49	18·8	8·4
65	58	63·7	49·1	53·4	19	9·5
75	66	59·9	59·9	56·6	22·7	9·9

HETEROCENTROTUS TRIGONARIUS.

Longest diam.	Morphol. axis.	Percentage value of				
		Height.	Actinostome.		Abactinal area.	Anal area.
			Long axis.	Morph. axis.		
45	36	58·3	61·1	59·7	20·8	9·7
60	50	60	55	55	20	10
73	66	56	50·7	51·5	18·9	9
93	78	56·4	51·9	50·6	21·1	10
113	91	54·9	..	...	19·7	8·7

As compared with *H. mammillatus*, we may note the striking equality of the lengths of the true and of the apparent long axes of the actinostome in this species.

COLOBOCENTROTUS.

The proportional measurements of the two species of this genus exhibit the greatest variability; and here, as in the case of *Heterocentrotus*, there is no marked diminution in the proportional value of the diameters of the actinal and abactinal series as the test increases in size.

This striking deviation from the ordinary rule does not show itself when the genus *Echinometra* proper comes to be studied; and it is impossible to resist the suspicion that the "obliquity" of the long axes of *Heterocentrotus* and *Colobocentrotus* on the one hand, and *Echinometra* on the other, is not altogether to be referred to the same cause.

[1] The percentage values are, of course, calculated from the *morphological* axis.

Colobocentrotus atratus[1].

Longest diam.	Morphol. diam.	Percentage value of				
		Height.	Actinostome.		Abactinal area.	Anal area.
			Long.	Morphol.		
42	39	40	42·3	42·3	18	7·9
53	47	53·1	51	48·9	21·2	8·5
67·5	61	50	43·4	41·8	22·1	8

Colobocentrotus mertensi.

Greatest length.	Morphol. axis.	Percentage value of				
		Height.	Actinostome.		Abactinal area.	Anal area.
			Long.	Morphol.		
49	44	35·2	44·3	45·4	23·6	8·1
50	43·5	42·5	48·5	48·5	25·5	10·3
55	48	38·5	39	37·2	20·8	7·7

Echinometra.

The characters of the different parts of the buccal apparatus seem here, as in so many other genera of regular Echinoidea, to present just those slight differences in detail which are so important an aid in the accurate discrimination of species.

The *alveolar foramen*, never large, is larger in *E. vanbrunti* and *E. viridis* (where it is nearly half as long as the whole alveolus), than it is in *E. lucunter* or *E. subangularis* (where it is very distinctly less than half the length); it is smallest in *E. lucunter*.

The *radius* is simplest in *E. lucunter*, widening only very gradually and very slowly, and not having its free end notched; in *E. vanbrunti* it is a little longer, distinctly wider, but only faintly notched. In *E. viridis* and *E. subangularis* the free end is wider; and in *E. subangularis* it is hammer-shaped, owing to its somewhat sudden widening out at its free end; but there is only a feebly developed notch. In *E. viridis* the notch is more distinct than in any of the three just mentioned species.

When the observer looks straight through the alveolar foramen, holding the tooth vertically, a delicate ascending and descending process on either side is to be observed in *E. vanbrunti*; in *E. lucunter* the ascending process can just be detected; in *E. subangularis* neither process can be seen; while in *E. viridis* it is the descending, instead of the ascending, process which is visible.

[1] This species would seem to be figured in the Phil. Trans. vol. xlix. (1755), pl. viii. fig. 3.

ECHINOMETRA LUCUNTER (Lamk.).

Questions of identifications of species are in some cases interminable; and we seem here to have an example of one in which there would be found much to say on both sides, were it worth the while, and were questions of synonymy the end of zoological science. I shall not, I imagine, be accused of any blind following of Prof. Alex. Agassiz; but I follow him in this case for what, I submit, is a sufficient reason. The labels of Linnæus's specimen of *E. lucunter* are lost; Leske found it difficult to decide to what figure of Klein's Linnæus meant to refer: Lamarck's typical specimens are in existence. The reviser of the group having to settle what species he would call *E. lucunter*, came to the conclusion that he would follow Lamarck. Whether the present writer would have done the same, had he been the reviser, need not be discussed; it is certain that had Prof. Lovén or Dr. Lütken been the revisers, they would have adopted a different course (*cf.* Agassiz, *op. cit.* p. 284). But a decision has been given; it is almost certain that no further light will ever be thrown on the difficulty; the 'Revision of the Echini' is our present standard. Let us, then, when we cannot oppose facts to facts, but only opinions to opinions, follow the Reviser, and let the question (and all such questions) drop.

Large forms of this species differ so much in appearance from smaller specimens, that, where the series fails, one is at once almost inclined to imagine that one has to do with a distinct species. One specimen in the national collection (which has its longest axis 79 and its morphological axis 76 millim. long) is greatly bowed on its actinal surface, and has the smaller tubercles exceedingly well developed; there is a large number of very small anal plates; here and there five pairs of pores are found in an arc. But the most striking variation, and one which, in our present state of information, we should almost be justified in taking as a basis for the formation of a distinct variety, represented by this form, lies in the characters of the auricular arch: there is a considerable development in the amount of calcareous matter there laid down; the arch is consequently very strong, the foramen very small, the top piece is well developed, and the connecting ridge, instead of being low, is nearly half the height of the whole arch.

The plates on the buccal membrane are very large; and the ends of the radii in the lantern of Aristotle are well developed.

On the other hand, the characters of the auricular arch are not very constant in this species; and the proportions of the parts of the specimen in question are not at all unlike those of a specimen 76 millim. in diameter, the measurements of which are given in the 'Revision of the Echini;' so that better service is done by directing attention to its peculiarities than by imposing a new name on this already heavily weighted species.

Two specimens, purchased in 1844 from Mr. Gould, bear the locality of "Abrolhos." I am unable to distinguish them from other specimens of *E. lucunter*; and I can hardly suggest that the locality given in the Register is altogether wrong; for one specimen, at any

rate, of those purchased at that time from Mr. Gould is a representative of *E. subangularis*[1].

ECHINOMETRA LUCUNTER.

Longest axis, in millim.	Morphol. axis, in millim	Percentage value of			
		Height.	Actino-stome.	Abactinal area.	Anal area.
19	18	44·4	50	25	11·1
29·5	27	49·2	46·2	23·9	11·1
...	31	41·9	40·3	22·5	11·25
53	51·5	58·2	43·1	19·4	10·9
54	53	49	43·3	18·5	9·25
59	55	58·1	42·7	21·8	10
65	63	59·5	38·8	17·6	10·3

The use of the percentage method in detecting variations, and the extent of the variations themselves, seem to be well shown in this Table.

ECHINOMETRA SUBANGULARIS.

Longest diameter, in millim.	Morphol. axis, in millim.	Percentage value of			
		Height.	Actino-stome.	Abactinal area.	Anal area.
14	13·25	45·2	52·6	26·7	9·5
31	30	46·5	46·5	20	10
46·2	45	.....	45·5	16·6	...
55	53·5	53·2	44·7	15·8	7·4
60	58	54·3	40	17·2	8·6

It may be well to direct attention to the fact that the longest axis is very little longer than the morphological axis, another point in which *Echinometra* contrasts very strongly with the two genera which here precede it.

ECHINOMETRA VANBRUNTI.

Long axis, in millim.	Percentage value of			
	Height.	Actino-stome.	Abactinal area.	Anal area.
28	39·2	46·4	19·6	10·7
57	49·8	38·6	...	...
57·5	51·3	36·5	16·5	9·5

[1] In a conversation with Mr. Howard Saunders I was reminded that there is a Houtman's Abrolhos on the western coast of Australia; and I have now no doubt that the registrar of the specimens in the year 1844 did not sufficiently distinguish between the two localities.

ECHINOMETRA MACROSTOMA.

The single spineless test which, as it seems, should be referred to this species, gives the following measurements :—

Greatest length, in millim.	Morphol. axis, in millim.	Percentage value of			
		Height.	Actino-stome.	Abactinal area.	Anal area.
45	43·5	50·5	43·9	20·6	11·2

It will be of great interest to examine the buccal apparatus of this rare species.

The specimen in the Museum collection bears no indication of its locality ; we know, however, that Dr. Lütken is satisfied as to certain specimens, at any rate, having come from Guinea[1].

ECHINOMETRA VIRIDIS.

Absol. diam., in millim.	Percentage value of			
	Height.	Actino-stome.	Abactinal area.	Anal area.
(?)11·5	34·7	52·1	45·2	11·3
13	40·3	48	20	11·6
15	36·6	50	20	11·6

STOMOPNEUSTES.

This is an exceedingly difficult genus, and one with regard to which we must have much more information than we possess at present before we can speak at all definitely as to its real affinities. Whatever be the meaning of the "eccentricity" of its test, I must confess that I see no reason, at present, for regarding it as morphologically comparable with that of *Echinometra* ; for the "tendency to obliquity" is only found in the axis of *old* specimens, whereas in *Echinometra* we are informed that the obliquity is "an embryonic feature." We shall do better to wait for more accurate information than to spend our time in reconciling statements which sufficiently well contradict themselves.

I give the figures following for what they are worth ; they prove that great variations obtain in the only species of the genus now known to us.

[1] *Cf.* Zool. Record for the year 1873.

STOMOPNEUSTES VARIOLARIS.

Absol. diam., in millim.	Percentage value of			
	Height.	Actino-stome.	Abactinal area.	Anal area.
59	52·5	27·1	16·1	8·1
60	50	31·6	16·6	...
69	52·1	28	17·3	8·6
73	53·4	26·6	20	10·9

STRONGYLOCENTROTUS.

In adopting the generic name of *Strongylocentrotus*, proposed in the year 1835 by Brandt, Prof. Alex. Agassiz has done no more than justice to that eminent naturalist; but this act of justice is accompanied by the considerable reward that it has enabled him to group under one name, for all practical purposes new [1], the varied forms which had been distributed among different generic sections under the names, chiefly, of *Euryechinus*, *Heliocidaris*, *Toxocidaris*, and *Loxechinus*.

It is the group which at present contains a larger number of species than any other Echinid genus: fourteen species are recognized in the 'Revision;' to this number I have myself been obliged to add one for the reception of certain specimens from the Straits of Magellan [2]; so far as I know, no other zoologist has obtained any representative of a new species.

STRONGYLOCENTROTUS ALBUS.

Absolute diameter, in millim.	Percentage value of			
	Height.	Actino-stome.	Abactinal system.	Anal area.
54	51·8	27·4	20·3	11·1
75	45·3	24	18	10·6
114	43·8	21·9	14	...
115	47·8	20·9	15·7	9·5

[1] The recognition of the name (*Strongylocentrus*) by Dr. Gray (1855) was, unfortunately, ignored by subsequent writers, and seems even to have escaped Mr. Agassiz. *Cf. op. cit.* p. 161.

[2] P. Z. S. 1881, p. 88.

STRONGYLOCENTROTUS ARMIGER.

Absolute diameter, in millim.	Percentage value of			
	Height.	Actino-stome.	Abactinal system.	Anal area.
26	48	34·6	19·2	10·5
32	46.8	32·8	18·7	10·9
47	46·8	31·9	19·1	8·9
69	40·5	28·9	15·9	7·2
76	46	30·2	16·1	7·2

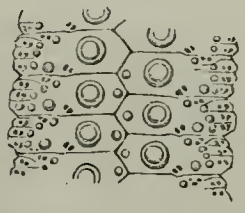
STRONGYLOCENTROTUS BULLATUS.

Absolute diameter, in millim.	Percentage value of			
	Height.	Actino-stome.	Abactinal area.	Anal area.
38	50	31·6	23·7	12·1
94	...	30·8	18	10·6
115	45·2	23·04	18·2	9·5

STRONGYLOCENTROTUS DEPRESSUS.

A dry test, denuded of spines, is very probably to be referred to this species; I proceed, however, to point out a number of characters by which it appears to differ from the descriptions of *S. depressus* as given by Prof. Alex. Agassiz, or the *E. disjunctus* of Prof.

Fig. 1.



Ambulacral area of *S. depressus*, to show the disposition of the pairs of pores.

von Martens. The test is not so depressed; the primary tubercles are not so numerous; the poriferous zone is not specially broad; and it is not the uppermost, but the lowermost pair of pores that is "disjunctum." As to this last point, however, there is possibly some error of observation, as it is difficult to see the exact position of the pair of pores in question, since they lie altogether at the edge of the plate. If the difference is real, it is probably one of specific importance. Prof. Agassiz remarks that in specimens with a depressed test, "the inner and one outer pairs of pores" are disconnected.

I give a short technical account of the test in question, together with the more important measurements.

Test somewhat depressed; apical system large; genital pores large; two large oculars touch the periproct; pairs of pores five in an arc; in one or two cases there are six; the lowermost pair is separated from and is internal to the rest, so that it forms a well-marked inner line. On each series of the plates of the corona there is a row of large primary tubercles, which rapidly diminish in size from the ambitus to the actinostome; at the ambitus the interambulacral tubercles have a smaller primary on either side; the outermost of these rows reaches to the actinostome, and extends also a short way up the side of the test; the inner row extends higher up the side of the test, but soon becomes lost on the actinal surface; the ambulacral plates are well provided with secondary and miliary tubercles on the actinal surface, but very slightly so on the abactinal. Actinostome moderate, actinal cuts slight, auricles rather delicate, foramen well marked, connecting ridge slight. General colour of the test yellowish green; the tubercles white. Spines? Hab.?

The following are the more important measurements.

Diameter.	Height.	Actinostome.	Abactinal area.	Anal area.
42	19	15·5	10	4
	[45·2][1]	[37·8]	[23·8]	[9·5]

STRONGYLOCENTROTUS DROBACHIENSIS.

Absolute diameter, in millim.	Percentage value of			
	Height.	Actinostome.	Abactinal area.	Anal area.
11	63·63	45·45	...	18·18
12	50	43·7	...	22·7
19	50	47	26·3	13·15
24	45·8	41·6	27·08	14·5
30	43·3	41·6	30	15
35	42·8	38·5	25·7	15
39	51·2	38·4	25·6	12·8
53[2]	56·6	35·8	22·6	13·2
(?)65	58·4	30·7	18·4	10·7

Some of the fluctuations in percentage values shown by the above table give an idea of the variations exhibited by this widely spread and circumpolar species. The author of the 'Revision of the Echini' rendered considerable service to the students of this and allied species, when he pointed out that under the name of *S. drobachiensis* it was necessary to include so many that are merely nominal.

Mr. Leigh Smith has presented to the British Museum specimens of this species which he dredged in the seas off Franz-Joseph Land, as well as others taken to the north of Spitzbergen; Messrs. Hart

[1] Percentage value.

[2] "*E. neglectus*."

and Feilden collected them at Franklin-Pierce Bay, Cape Napoleon, and Hayes Point, during the Arctic Expedition of 1875–76; Capt. Markham found specimens at 73° 10′ lat., 53° long.; the officers of the 'Valorous' Expedition collected specimens off Greenland. Other examples have lately been received from the United States Fishery Commission, which collected them at Eastport, Maine.

STRONGYLOCENTROTUS ERYTHROGRAMMUS.

Absolute diameter, in millim.	Percentage value of			
	Height.	Actino-stome.	Abactinal system.	Anal area.
27·5	47·2	30·9	18·1	9·05
35	40	...	20	8·5
57	47·3	31·5	19·3	9·2
57	45·6	30·7	19·3	10·9 [1]
100	48	29	13	7·5

STRONGYLOCENTROTUS FRANCISCANUS.

Absolute diameter, in millim.	Percentage value of			
	Height.	Actino-stome.	Abactinal area.	Anal area.
90	55·5	25·5	23·7	...
110	46·46	30·9	18·1	10

STRONGYLOCENTROTUS GIBBOSUS.

This species, obviously, does not lend itself to proportional measurements.

STRONGYLOCENTROTUS LIVIDUS.

Absolute diameter, in millim.	Percentage value of			
	Height.	Actino-stome.	Abactinal area.	Anal area.
24·5	50	36·7	22·8	12
34	47	32·3	20·5	8·7
38	47·3	31·5	19·2	9·8
60	55·5	29·1	18·3	10
63	49·2	30·1	16·6	...

[1] Madreporic plate considerably swollen.

STRONGYLOCENTROTUS PURPURATUS.

Absolute diameter, in millim.	Percentage value of			
	Height.	Actino-stome.	Abactinal area.	Anal area.
50	44	34	18	10
53	52·8	32	17·4	8·9
55	44·1	30·9	18·1	9

STRONGYLOCENTROTUS TUBERCULATUS.

Absolute diameter, in millim.	Percentage value of			
	Height.	Actino-stome.	Abactinal area.	Anal area.
26	46·1	34·6	19·2	9·6
31·5	44·4	33·3	19	10·3
43	50	32·5	20·9	10·4
54	46·3	27·7	16·6	7·4
60	48·3	31·6	15·8	6·6

Owing to the fact that the number of species in this genus is, among the Echinoidea, so large, I have added to the Tables just given others, which show certain points in the characters of the different species which are undoubtedly of specific value.

I have for these points examined every species which is represented in the national collection; and I have to express my hope that other observers will fill in the lacunæ in our knowledge of the points now to be discussed.

Relations of the Ocular Plates to the Anal Area.

(α) All shut out. . . . . i. *bullatus*.
ii. *lividus*
(and, as we may suppose, *gaimardi*).
iii. *depressus*.

(β) Two touch . . . . . iv. *armiger*.
v. *drobachiensis*.
vi. *erythrogrammus*.
vii. *franciscanus*.
viii. *intermedius*.
ix. *purpuratus*.
x. *tuberculatus*.

(γ) Three touch . . . . . xi. *gibbosus*.

(δ) Four touch . . . . . xii. *albus*[1].

[1] This is true of full-grown specimens. In the younger all the oculars may be shut off; but it is possible that four of these have even then a different position to the fifth, or one lying to the right of the madreporic plate.

I am unable to give any information as to the oculars of *S. mexicanus* or *S. nudus*: no mention is made of this character in the diagnoses given in the 'Revision;' nor are they there figured. Neither species is represented in the British Museum.

With regard to the characters of the *radius*, the number of species on which I have any thing to report is, unfortunately, still smaller; the buccal apparatus of *S. franciscanus*, *S. gibbosus*, and *S. depressus* being wanting from the British-Museum specimens.

S. tuberculatus would appear to be distinguished by the fact that the radius is not notched terminally, while in *albus*, *armiger*, *erythrogrammus*, *intermedius*, and *purpuratus* it is always so notched; *S. bullatus* rather has the free end of the radius deeply *grooved* than notched.

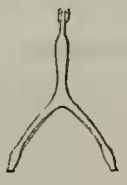
Characters of ascending and descending Tooth-processes.

(α) Both present	i. *erythrogrammus*.
(β) Ascending process evanescent.....	ii. *armiger*.
(γ) Ascending process absent	iii. *albus*.
	iv. *bullatus*.
	v. *drobachiensis*.
	vi. *intermedius*.
	vii. *lividus*.
	viii. *purpuratus*.
	ix. *tuberculatus*.

Sphærechinus.

The difficulties which are offered by the great development of the tubercles and the special characters of the gill-cuts in species of this

Fig. 2.



Radius of *S. granularis*, seen from in front.

genus have always appeared to me to stand in the way of the view taken by Prof. A. Agassiz, which regards this genus as a subgenus of *Strongylocentrotus*. An examination of the buccal apparatus seems to me to do more than justify this hesitation. The free end of the radius, in place of being merely widened out at its end, presents a strong and deep furcation, each leg of the fork measuring 6 millim., in a radius of which the azgyos piece was 11 millim. long, and the angle so wide as to separate the free ends of the legs by 5 millim. It has not been my fortune to meet with so aberrant an arrangement in any other regular Echinid save *Toxopneustes*.

Sphærechinus granularis.

Absolute diameter, in millim.	Percentage value of			
	Height.	Actino-stome.	Abactinal area.	Anal area.
i. 49[1]	61·2	36·7	18·35	10
ii. 50[1]	62	36	18	10
iii. 57[1]	63·1	35	15·8	8·3
iv. 64[1]	56·2	32·8	19·2	11·7
v. 70[1]	68·5	29·2	17·1	9·3
vi. 78[1]	64·1	29·5	19·2	10·9
vii. 85[1]	54·1	29·4	15·3	7
viii. 36	72·2	36	16·6	8·3
ix. 75	56	33·3	16	8·6
x. 102	66·1	28·4	15·6	8 3

The first seven specimens, coming all from one locality, are very interesting, as exhibiting the range and character of the variations in this eminently variable genus.

Pseudoboletia.

This genus has been so amply defined by Prof. Troschel, that it is only necessary to put his definition into English. "Test flattened and curved, thin; tubercles small; four pairs of pores in an arc; two ocular plates touch the periproct; rather deep gill-fissures; auricles with large foramen and low connecting ridge. It is distinguished from *Boletia*, Desor, by having four pairs of pores in each arc."[2]

Two species have been described in it—one by Michelin as *indiana*, the other by A. Agassiz as *Boletia granulata*. By the latter author *Pseudoboletia* is recognized as a subgenus, and *P. stenostoma* and *P. maculata* of Troschel are stated to be synonymous with *P. granulata* and *P. indiana* respectively.

There are certainly two species in the British-Museum collection; and one is just as certainly *P. indiana*; the other species is certainly *stenostomatous* as compared with *P. indiana*, and even more so than was Prof. Troschel's specimen; this, of course, may be due to the fact of its being older. When we study it by the aid of the original definition[3] of *B. granulata*—"remarkable for its comparatively long spines; tubercles uniform in size, very closely crowded together,"—we are unable to gain any assistance from the first clause, owing to the absence of the spines; but the second half of the definition applies very well; and, on the whole, I am inclined to feel certain that the specimens are representatives of *P. granulata*. If, however, they are so, they give a somewhat different aspect to the

[1] These specimens were collected at Naples.
[2] Sitzb. naturh. Ver. preuss. Rheinl. 1859, p. 96.
[3] Bull. M. C. Z. i. 2 (1863), p. 24.

geographical distribution of the species than it has had hitherto; for the two specimens are both reported to have come from the island of Mauritius, whence the other species (*P. indiana*) has (as it seems) been already obtained; and the only locality for *P. granulata* hitherto recorded is that of the Sandwich Islands. *P. indiana* has been received from

(*a*) Masbate,
(*b*) Philippine Islands,
(*c*) Zamboanga (coll. Challenger),
(*d*) Port Lincoln, Torres Straits.

I do not find myself able to agree with the view according to which we should regard *Pseudoboletia* as standing in subgeneric dependence to *Strongylocentrotus*. It seems to me that, as defined by Prof. Troschel, it has the most distinct characters; the constant possession of four pairs of pores, the deep gill-fissures and large gills, the constant abutting of two ocular plates on the anal region, the very considerable size of the lantern of Aristotle, are certainly enough characters which can hardly be subordinated to the form in which variability in the number of pores is found even in individual specimens, in which the gill-cuts are always slight, in which no ocular plate, or only one, may touch the anal area, and in which the buccal apparatus does not attain to any specially large size.

But I need hardly attack this "man of straw;" for although Prof. Alex. Agassiz does technically regard it as a subgenus, yet he (p. 455) speaks of it as a genus, and regards it as intermediate between the Echinometradæ and the Echinidæ.

The size of the buccal apparatus is very remarkable: in two specimens of *P. indiana*, which had the test respectively 32 and 25 millim. high, the height of the lantern of Aristotle was 26 and 22 millim. respectively. If similar results should be obtained with *P. granulata*, it will be necessary to introduce the character into the diagnosis of the genus, and to examine into the extent of its affinity to *Heterocentrotus*.

PSEUDOBOLETIA GRANULATA.

Absolute diameter, in millim.	Percentage value of			
	Height.	Actino-stome.	Abactinal area.	Anal area.
80	43·7	36·2	15·6	6·8

Pseudoboletia indiana.

Absolute diameter, in millim.	Percentage value of			
	Height.	Actino-stome.	Abactinal area.	Anal area.
70	45·7	42·1	16·4	7·1
53	47·1	42·4	15	...
52	49·4	40	12·3	...

Echinostrephus.

For the present it is not possible to do more than give the accompanying table of measurements; when any change is made in the position of this curious genus, it should be based on a fuller knowledge of its life-history than we at present possess. In the meantime, in its unusual form it stands alone, not only among the Echinometridæ, but among all the Echinidæ. The smallest specimen measured (which is also smaller than any measured by Prof. Alex. Agassiz) would seem to show that there is, during the rather earlier stages, a considerable diminution in the proportional values of the abactinal and actinal areas.

Echinostrephus molare.

Absolute diameter, in millim.	Percentage value of			
	Height.	Actino-stome.	Abactinal area.	Anal area.
14·5	48·2	44·8	27·5	13·5
25	54	38	23	10
26·5	49	32	22·6	...

2. Description of a New Species of the Genus *Mespilia*. By F. Jeffrey Bell, M.A., F.Z.S.

[Received February 24, 1881.]

When, last year, I was engaged in naming and revising the specimens of Temnopleuridæ in the British Museum, I was unable to satisfy myself as to the exact specific nature of the specimen now to be described, and which I propose to name after its discoverer.

Mespilia whitmæi, n. sp.

The examination of this species revives nearly all the difficulties as to the definition of the genera *Mespilia* and *Amblypneustes*. The